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TWO NEW CHIPMUNKS FROM COLORADO AND ARIZONA.

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Both of the chipmunks here described are of unusual interest. One inhabits the pinyon and juniper belt in the desert region of northeastern Arizona and southeastern Utah, and is one of the handsomest members of the genus; the other is the common small chipmunk of the high mountains of Colorado: it has been previously confused with quadrivittatus of Say, which proves to be a much larger species. The specimen on which Say's species was based was collected by Long's Expedition to the Rocky Mountains on July 17 or 18, 1830, on the Arkansas River. The party, which included the naturalist Thomas Say, was encamped from the evening of July 16 to the morning of July 19, at a locality described as about thirty miles below "the place where the river leaves the mountains," which would be about 26 miles below the present Canyon City. Referring to this camp, Say states. "Among the animals taken here, was the four-lined squirrel (S. 4-vittatus) a very small and handsome species." This fixes the type locality with a definiteness not open to question.

Recent field work in eastern Colorado shows that two species of chipmunk occur in the region, one inhabiting the Boreal zone in the high mountains, the other the Transition and Upper Sonoran foot hills, extending out toward the plain as far as the land is covered with a scattered growth of junipers. The (163)

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mountain species is slightly smaller than the foot-hills form, but the name "quadrivittatus" has been commonly applied to both. Say's original description is equally applicable to both, except for the measurements, which were given as follows :

"Length from the nose to the base of the tail, $4\frac{1}{4}$ inches,

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of the tail,

of the hair at tip of the tail, 1 nearly."

As we measure mammals nowadays, Say's measurements of body and tail are too small for even the smaller of the two species, but it must be remembered that at the time Say wrote, and for half a century afterwards, no rules for the measurement of mammals had been formulated, and that by the old method the dimensions recorded were considerably less than by present methods. Furthermore, the difference in size of the two species is so slight that the fact that there are two species in the region appears to have thus far escaped the attention of naturalists. The third measurement given by Say, that of the length of hair at tip of tail, agrees best with the larger species the tail hairs of the smaller one, particularly in worn summer pelage, falling considerably short of an inch.

Field work conducted in Colorado by several field naturalists of the Biological Survéy (E. A. Preble, J. Alden Loring, and Vernon Bailey) has demonstrated the fact that the larger of the two chipmunks is common throughout the Arkansas Valley in the region at which the type specimen was obtained, and that the small mountain species does not occur in the region at all and can not be found until the mountains are penetrated far enough to reach the Boreal zone. This shows beyond question that Say's *quadrivittatus* is the foot-hill chipmunk of eastern Colorado, and that the mountain species, which has commonly been included under this name, requires a new name.

Comparison of the Colorado mountain chipmunk with the other small chipmunks of the West shows that its nearest relative is *E. amænus* of the California Sierra, thus affording another instance of the close relationship of species inhabiting the mountains bordering the two sides of the Great Basin.

Eutamias amœnus operarius subsp. nov.

Type from Gold Hill (altitude 7,400 feet), Colorado. No. 129,808, φ young adult, U. S. National Museum, Biological Survey Collection. October 8, 1903. Vernon Bailey. Original No. 8160.

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Characters.—Similar to *amenus* but lacking the distinct black on anterior two-thirds of posterior aspect of ear; lower dark cheek stripe and stripe between eye and ear usually narrower; tail longer; upper side of tail more strongly fulvous, the underlying black less marked; underside of tail with submarginal black band narrower; median dorsal stripe blacker and more pronounced on back of neck and occiput; outer lateral stripe more pronounced.

In the late fall pelage, which lasts until the breeding season, the rump and middle pair of dorsal light bands are gray, as in *amænus*, but in postbreeding pelage the rump is more olivaceous, more or less grizzled with fulvous; the middle pair of pale dorsal stripes are less gray, and the shoulders and anterior part of back more deeply and extensively fulvous. Some specimens in postbreeding pelage have the underparts suffused with yellowish and fulvous as in the larger *luteiventris*.

Measurements (taken in flesh).—Type specimen: Total length, 200; tail vertebræ, 93; hind foot, 31. A verage of 10 specimens from Estes Park, Colorado: Total length, 199; tail vertebræ, 92; hind foot, 31.

Eutamias hopiensis sp. nov.

Type from Keam Canyon, Painted Desert, Arizona. No. 67,768, Q adult, U. S. National Museum, Biological Survey Collection. July 27, 1894. A. K. Fisher. Original No. 1688.

Characters.—Size medium or rather large, as in *quadrivittatus*; general color pale golden fulvous, particularly in winter pelage when even the dark stripes are only slightly deeper fulvous than the flanks; head and rump pale.

Color.—Top of head pale buffy gray, slightly darker in postbreeding pelage; rump, pale grizzled ochraceous gray, only slightly darker in postbreeding pelage; outer pair of light stripes white; inner pair of light stripes grizzled white and gray, sometimes tinged with buffy; dark dorsal stripes in winter bright fulvous, in summer with black centers; tail deep rufous, the underlying black showing through from above; under side with black submarginal band rather narrow.

Measurements.—Average of 10 specimens from type locality measured in flesh: Total length, 224; tail vertebræ, 101; hind foot, 33.5.

Remarks.—Dr. Fisher collected a fine series of this remarkably handsome chipmunk in the juniper and pinyon belt at Keam Canyon, where it was living among rocks and cliffs. He tells me that its name in the language of the Hopi (or "Moki") Indians is *Kowéna*. The Biological Survey has specimens also from Bluff City, Utah, collected by J. Alden Loring. The species has been previously referred to *gracilis*—a very different animal and one which proves to be hardly distinguishable from true *quadrivittatus* of Colorado.